Chapter

Two

History of

Religion & Science
UNDERSTANDING THE CONCEPT OF RELIGION

Sometimes the word "religion" appears to be so simple that each man can understand the meaning of the word. Sometimes it appears to be so difficult to understand. A number of modern scholars of religions have commented on the difficulty of defining what religion is.

There are many different religions in the world. Religions try to answer important but mysterious questions like "Where did the world come from?" and "What happens to us after we die?" When people believe that they have answers to these questions, they often start new religions, or add their new ideas to old religions.

Many religions believe in supernatural beings such as spirits, angels, devils, polytheistic gods, or a monotheistic god (such as the Christian, Islamic, or Judaic God), who can influence people and the world. People who teach or write about religion often say that they got their ideas from a supernatural being.

Many religions are very old, but new religions are always being created when some people are not satisfied with the answers from the old religions. Things which are considered important and good by religions are called sacred or holy. Many religions have sacred books that give the most important ideas and stories of their religions.

Religions usually say how people should behave in order to be happy together or to please God. Many religions believe that people who live in a right way will go to Heaven forever after they die, or that people who live in a wrong way will go to Hell. Some religions believe in the Resurrection - which God will bring some, most or all dead people alive
again one day; while other religions believe in Rebirth – that is people will be born again as a new person or as an animal after they die. Usually this is believed to be according to how a person acts in the present life. Some religions believe a mixture of all of these ideas.

All religions teach people to be good and to help each other; unfortunately religions also sometimes create problems. This is partly because the questions of religion are so important to people, and because it is difficult to be sure which answers are correct. Many people are unhappy when other people do not agree with their ideas about religion, or when they think that people will cause problems for their religion.

ETYMOLOGY OF THE WORD “RELIGION”

There are many definitions of religion, and most have struggled to avoid an overly sharp definition on one hand, and meaningless generalities on the other. Some have tried to use formalistic, doctrinal definitions and others have tried to use experiential, emotive, intuitive, valuation and ethical factors.

We have some philosophical and some theological definitions. Some other kinds of definitions are social or political or psychological definitions.

-Latin religio means: to connect.
- The word "religion" generally comes to indicate all forms of ceremonial community worship.

Cambridge Encyclopedia points out that Dictionary has made many attempts to define the word religion:

...No single definition will suffice to encompass the varied set of traditions, practices, and ideas which constitute different religions.
Webster dictionary\(^3\) states that religion means any specific system of belief and worship, often involving a code of ethics and philosophy.

The two important components of religions are:

1. One's belief and worship in a deity or deities.

2. One's ethical behavior towards other persons.

A definition makes the point stating that "a community striving to come to the pure essence of the worship of YHWH" and cites definitions from an unknown dictionary: "religion (ri-
lij'[uh] n) n.

A. The beliefs, attitudes, emotions, behavior, etc., constituting man's relationship with the powers and principles of the universe, especially with a deity or deities; also, any particular system of such beliefs, attitudes, etc.

B. An essential part or a practical test of the spiritual life.

C. An object of conscientious devotion or scrupulous care: e.g. His work is a religion to him.

D. Religious practice or belief."

E. An organized system of belief that generally seeks to understand purpose, meaning, goals, and methods of spiritual things. These spiritual things can be God, people in relation to God, salvation, after life, purpose of life, order of the cosmos, etc.

Religion is defined as the beliefs, attitudes, emotions, behavior, etc., constituting man's relationship with the powers and principles of the
universe especially with a deity or deities, also any particular system of such beliefs, attitudes, etc.

Religion also means 'Human beings' relation to that which they regard as holy and sacred, spiritual or divine^4.

Religion is defined in terms such as any specific system of belief and worship, often involving a code of ethics and a philosophy. This definition would exclude religions that do not engage in worship^5.

The English word "religion" is derived from the Middle English "religioun" which came from the Old French "religion." It may have been originally derived from the Latin word "religo" which means "good faith," "ritual," and other similar meanings. It may have come from the Latin "religre" which means "to tie fast."

The Encyclopedia of Religion describes religion in the following way:

"In summary, it may be said that almost every known culture involves the religious in the above sense of a depth dimension in cultural experiences at all levels — a push, whether ill-defined or conscious, toward some sort of ultimacy and transcendence that will provide norms and power for the rest of life. When more or less distinct patterns of behavior are built around this depth dimension in a culture, this structure constitutes religion in its historically recognizable form. Religion is the organization of life around the depth dimensions of experience — varied in form, completeness, and clarity in accordance with the environing culture."^6
Therefore; "Religion", sometimes used interchangeably with faith, is commonly defined as belief concerning the supernatural, sacred, or divine, and the practices and institutions associated with such belief. In its broadest sense some have defined it as the sum total of answers given to explain mankind's relationship with the universe. Occasionally, the word "religion" is used to designate what should be more properly described as a "religious organization" – that is, an organization of people that support some religion, often taking the form of a legal entity.

What are Problems with definitions?

Defining the word "religion" is fraught with difficulty. All of the definitions noticed contain at least one or the other deficiency. Some exclude beliefs and practices that many people passionately defend as religious. For example, one definition might include belief in a personal deity or some supernatural entities. This excludes such non-theistic religions as Buddhism and religious Satanism which have no such belief.

Some definitions equate "religion" with "Christianity," and thus consider two out of every three human being in the world as non-religious. Some definitions are so broadly written that they include beliefs and areas of study that most people do not regard as religious. For example, David Edward's definition would seem to include within his definition of religion cosmology and ecology fields of investigation that most people regard to be a scientific studies and non-religious in nature. Some define "religion" in terms of "the sacred" and/or "the spiritual", and thus necessitate the creation of two more definitions. Sometimes, definitions of "religion" contain more than one deficiency.
Karl Heinrich Marx (1818-1883): Religion is the sight of the oppressed creature, the heart of heartless world, just as is the spirit of a spiritless situation; it is the opiate of the people\textsuperscript{13}.

Bertrand Russell: Religion is something left over from the infancy of our intelligence\textsuperscript{14}.

Friedrich Daniel Ernest Schleiermacher (1768-1834): The essence of religion consists in the feeling of an absolute dependence\textsuperscript{15}.

Emil Durkheim (1858-1917) “Society has to be present within the individual. Religion is as a mechanism that shored up or protected a threatened social order.” According to Durkheim religion had been the cement of society in the past, but that the collapse of religion would not lead to a moral implosion. Durkheim was specifically interested in religion as a communal experience rather than an individual one. His view is that religious phenomena occur when a separation is made between the profane (the realm of everyday activities) and the sacred (the realm of the extraordinary and the transcendent) these are different depending what man chooses them to be. An example of this is wine at communion, as it is not only wine but represents the blood of Christ. Durkheim believed that religion is ‘society divinized’, as he argues that religion occurs in a social context. He also, in lieu of forefathers before who tried to replace the dying religions, urged people to unite in a civic morality on the basis that we are what we are as a result of society.

Durkheim condensed religion into four major functions:

1. Disciplinary, forcing or administrating discipline
2. Cohesive, bringing people together, a strong bond
3. Vitalizing, to make more lively or vigorous, vitalise, boost spirit
4. Euphoric, a good feeling, happiness, confidence, well-being

OUR COMPROMISE DEFINITION

Religion defined in comprehensive terms: A very broad definition of religion can be attempted: "Religion is any specific system of belief about deity, often involving rituals, a code of ethics, a philosophy of life, and a worldview." (A worldview is a set of basic, foundational beliefs concerning deity, humanity and the rest of the universe.) Thus we would consider Christianity, Islam, Judaism, Native American Spirituality, and Neopaganism to be religions. Thus any collection of doctrines or any specific system of belief that spring from the revelation of prophets for human guidance and illustrated as descriptive or normative statements constitutes religion.

THE NEED FOR RELIGION

It is not possible to separate man's way of thinking from his way of living and his dealing with life. Man is a wise and understanding being who thinks for himself, wants to comprehend his surroundings and tries to know the beginning and the end of everything, in order to be able to understand the mysteries of the world and the beings around him. He tries to discover: How did this world begin? Where is it going to? Why is he here in this life? What is the goal of his existence? Where will he end? What does life itself mean? How should he conduct his life? Man has always been looking for convincing answers to these questions.

The answer to these questions either leads him to happiness and welfare, or wretchedness and misfortune. The answers, though short in
their form and brief in their expression, are yet great in their meanings, important in their reality and deep in their effects.

It is these answers which define how man should live, behave, and understand life and estimate the importance of his own existence. By providing correct answers one may resolve an important crisis of thought- the crisis from which man has long been suffering. Unable to find correct answers, he has been tormented by anxiety and uncertainty and forced to wander through an abyss of suffering in life, and soundly evaluate life and man's existence. The correct answers to these questions have always been confined to two contradictory theories, both in their truth and in the resulting constructions that are based upon them. The two answers are: The first given through religion, lighting the path of righteousness and faith with rational proof; the second given by error and denial, aiming at invoking mist to obliterate clear visibility, to envelope man's conscience and prevent it from directing itself towards Allah, the Beginning and the End of existence.

The answer of religion offers, through its call and message, and interpretation of the universe and life, and an explanation of man's existence, and of his links with them; while the other answer bases its explanation in retort to the idea of faith, denying its reasoning and explanation. Religion bases its interpretation and viewpoint on believing that this universe, life and man have a Creator, a Lord, a God head; and that man's existence on this earth is neither a meaningless and aimless one, nor is it a random happening. Life and man have their goals and values exceeding the time span of man's existence on the earth's surface. He has a supreme objective to pursue, embodying it through his attitudes,
his deeds and his general activities in a world that goes beyond perception and the time spent in this world.

**Etymology of the word “Science”**

The word *science* comes from the Latin word *scientia* for ‘knowledge’, which in turn comes from scio – ‘I know’. The Indo-European root means ‘to discern’ or ‘to separate’, akin to Sanskrit ‘chteri’, ‘he cuts off’, Greek ‘schizein’, ‘to split’, Latin ‘scindere’, ‘to split’. From the middle Ages to the Age Enlightenment, science or scientia meant any systematic or exact recorded knowledge. Science therefore had the same sort of very broad meaning that philosophy had at that time. In some languages, including French, Spanish, Portuguese, and Italian, the word corresponding to science still carries this meaning.

From classical times to the advent of the modern era, philosophy was divided into natural philosophy and moral philosophy. In the 1800s, the term natural philosophy gradually gave way to the term natural science. Natural science was gradually specialized to its current domain, which typically includes the physical sciences and biological sciences. The social sciences, inheriting portions of the realm of moral philosophy, are currently also included under the auspices of science to the extent that these disciplines use empirical methods. As currently understood, moral philosophy still retains the study of ethics, regarded as a branch of philosophy and one of the three classical normative sciences.

**UNDERSTANDING THE CONCEPT OF SCIENCE**

How do we define science? According to Webster's New Collegiate Dictionary, the definition of science is "knowledge attained
through study or practice," or "knowledge covering general truths of the
operation of general laws, especially as obtained and tested through
scientific method [and] concerned with the physical world."

What does that really mean? Science refers to a system of
acquiring knowledge. This system uses observation and experimentation
to describe and explain natural phenomena. The term science also refers
to the organized body of knowledge people have gained using that
system. Less formally, the word science often describes any systematic
field of study or the knowledge gained from it.

Most scientific investigations use some form of the scientific method.
Science as defined above is sometimes called pure science to differentiate
it from applied science, which is the application of research to human
needs. Fields of science are commonly classified along two major lines of
- Natural sciences, the study of the natural world, and
- Social sciences, the systematic study of human behavior and society.

The Oxford English Dictionary defines science as:

1. The state of fact of knowing; knowledge or cognizance of
   something specified or implied; also, with wider reference,
   knowledge (more or less extensive) as a personal attribute.
   (Now only theological and philosophical.)

2. Knowledge acquired by study; acquaintance with or mastery
   of any department of learning. Also (plural) (a person's)
   various kinds of knowledge. b) Trained skill

3. A particular branch of knowledge or study; a recognized
   department of learning. b) Contradistinguished from art....d)
   a craft, trade or occupation requiring trained skill.
4. In a more restricted sense: A branch of study which is concerned either with a connected body of demonstrated truths or with observed facts systematically classified and more or less colligated by being brought under general laws, and which includes trustworthy methods for the discovery of new truth within its own domain.

5. The kind of knowledge or of intellectual activity of which the various sciences are examples. In modern use, chiefly: The sciences (in sense 4) as distinguished from other departments of learning; scientific doctrine or investigation.... b) In modern use, often treated synonymous with 'Natural and Physical Science,' and thus restricted to those branches of study that relate to the phenomena of the material universe and their laws, sometimes with implied exclusion of pure mathematics.

Another dictionary states that science means:

1- A: The observation, identification, description, experimental investigation, and theoretical explanation of phenomena.

b. Such activities restricted to a class of natural phenomena.

c. Such activities applied to an object of inquiry or study.

2- Methodological activity, discipline, or study: I have got packing a suitcase down to a science.

3- An activity that appears to require study and method: the science of purchasing:

4. Knowledge especially that gained through experience.
5- The state or fact of knowing; knowledge or cognizance of something specified or implied; also with wider reference, knowledge (more or less extensive) as a personal attribute.

6-a. knowledge acquired by study; acquaintance with or mastery of any department of learning.

B: Trained skill.

In the modern use, science is often treated as synonymous with "natural and physical science" and thus restricted to those branches of study that are related to the phenomena of the material universe and their laws, sometimes with implied exclusion of pure mathematics. This is now the dominant sense in ordinary use.

In another definition, "Science is devoted to formulating and testing naturalistic explanations for natural phenomena. It is a process for systematically collecting and recording data about the physical world, then categorizing and studying the collected data in an effort to infer the principles of nature that best explain the observed phenomena. Science is not equipped to evaluate supernatural explanations for our observations; without passing judgment on the truth or falsity of supernatural explanations, science leaves their consideration to the domain of religious faith. Because the scope of scientific inquiry is consciously limited to the search for naturalistic principles, science remains free of religious dogma and is thus an appropriate subject for public-school instruction."

It seems the word *science* is used as equivocal, that has several meanings.

Sometimes it is used as certainty, to denote positive and certitude knowledge of science in this meaning versus the illusional propositions.
Science is used also as an organization of acquired statements and proposition such as philosophical or natural or historical sciences.

Experimental sciences can also be divided according to its subject or belonging to humanities and natural, therefore, includes sciences like psychology or sociology and economics or chemistry and physics, etc.

The meaning of science in relationship between religion and science is experimental science that includes natural and humanities. In the Islamic and religious views, science has another interpretation that will be discussed in the next chapter.

Experimental science is known to arrive at and finding of natural laws or canons and explaining the facts or its quality, position that is used with objectivity and experimentation, prediction and selection and hypothetic-deductive method.

The philosophical discussion of the relationship between modern science and religion has tended to focus on Christianity, because of its dominance in the west.

**Sciences, Classification**

*Science* (scientia) is an analogy legitimately but diversely applicable to many differing senses and to many disciplines in a set in which demonstrated knowledge ranks as prime analogy. To illustrate the various possibilities of different ways in which the sciences can be classified are first considered. Then the different ways in which the sciences have been classified - according to some *interpretations* - by certain key figures in the history of thought are sketched with emphasis upon the classification proposed by St.Thomas Aquinas.
Scientific method

Science can be defined as a systematic study of the nature and the behavior of material and physical universe based on observation, experiment and measurement. It is a method of approach to the entire empirical world. It is furthermore an approach, which does not aim at “persuasion”, at the finding of “ultimate reality” or at “conversion”\(^ {21} \). Procedures for attaining scientific knowledge are known as scientific methods. These methods include formulating theories and testing them against observation or experiment. Ancient and medieval thinkers called any systematic body of knowledge a ‘science’, and their methods were aimed at knowledge in general.

According to the most common model for scientific knowledge, formulated by Aristotle, induction yields universal propositions from which all knowledge in a field can be deduced. This model was refined by medieval and early modern thinkers, and further developed in the nineteenth century by Whewell and Mill\(^ {22} \). As Kuhn observed, idealized accounts of scientific method must be distinguished from descriptions of what scientists actually do. The methods of careful observation and experiment have been in use from antiquity, but became more widespread after the seventeenth century. Developments in instrument making, in mathematics and statistics, in terminology, and in communication technology have altered the methods and the results of science.

‘Method’ comes from the Greek Meta (after) plus hodos (path or way). A method is a way to achieve an end; a scientific method is a way to achieve the ends of science. What those ends are depends on what science is or is taken to be. The word ‘science’ now means primarily natural science, examples of which are physics, astronomy, biology,
chemistry, geology and psychology, and it applies secondarily to social sciences such as economics and sociology. Discussions of method focus on the cognitive aims of science, which may include knowledge, understanding, explanation, or predictive success, with respect to all or part of nature or to some domain of natural or social phenomena. Abstractly described, scientific method is the means for attaining these aims, especially by forming models, theories, or other cognitive structures and testing them through observation and experiment. Investigations of scientific method may describe the methods actually employed by scientists, or they may formulate proposals about the procedures that should be followed to achieve scientific knowledge.

**Goals of science**

It has been said that it is virtually impossible to make inferences from human senses which actually describe what “is.” On the other hand, people can form hypotheses based on observations that they make in the world. By analyzing a number of related hypotheses, scientists can form general theories. These theories benefit society or human individuals who make use of them. For example, Newton's theories of physics allow us to predict various physical interactions, from the collision of one moving billiard ball with another, to trajectories of space shuttles and satellites. Relativity can be used to calculate the effects of our sun's gravity on mass light-years away. The social sciences allow us to predict (with limited accuracy for now) things like economic turbulence and also to better understand human behavior and to produce useful models of society and to work more empirically with government policies. Chemistry and biology together have transformed our ability to use and predict chemical and biological reactions and scenarios. In modern times though, these
segregated scientific disciplines (notably the latter two) are more often being used together in conjunction to produce more complete models and tools. One goal of science is to explain and utilize multiple known phenomenons with one theory or set of theories.

Despite popular impressions of science, it is not the goal of science to answer all questions. The goal of the sciences is to have publicly testable thoughts about the world. Science cannot possibly address nonsensical, or attestable questions, so the choice of which questions to answer becomes important. Science does not and cannot produce absolute and unquestionable truth. Rather, science tests some aspects of the world and provides a reasonable theory to explain them.

Science is not a source of subjective value judgments, though it can certainly speak to matters of ethics and public policy by pointing to the likely consequences of actions. What one projects from the currently most reasonable scientific hypothesis onto other realms of interest is not a scientific issue, and the scientific method offers no assistance for those who wish to do so. Scientific justification (or refutation) for many things is, nevertheless, often claimed.

Science is a useful tool and it is a growing body of understanding that allows us to contend more effectively with our surroundings and to better adapt and evolve as a social whole as well as independently.

Individualism is a tacit assumption underlying most empiricist accounts of science which treat science as if it were purely a matter of a single individual confronting nature, testing and predicting hypotheses. In fact, science is always a collective activity conducted by a scientific community. This can be demonstrated in many ways, perhaps the most
fundamental and trivial of which is that scientific results must be communicated with language. Thus the values of scientific communities permeate the science they produce.

For a large part of recorded history, science had little bearing on people's everyday lives. Scientific knowledge was gathered for its own sake, and it had few practical applications. However, with the dawn of the Industrial Revolution in the 18th century, this rapidly changed. Today, science has a profound effect on the way we live, largely through technology—the use of scientific knowledge for practical purposes.

Some forms of technology have become so well established that it is easy to forget the great scientific achievements that they represent. The refrigerator, for example, owes its existence to a discovery that liquids take in energy when they evaporate, a phenomenon known as latent heat. The principle of latent heat was first exploited in a practical way in 1876, and the refrigerator has played a major role in maintaining public health ever since. The first automobile, dating from the 1880s, made use of many advances in physics and engineering, including reliable ways of generating high-voltage sparks, while the first computers emerged in the 1940s from simultaneous advances in electronics and mathematics.

Other fields of science also play an important role in the things we use or consume every day. Research in food technology has created new ways of preserving and flavoring what we eat. Research in industrial chemistry has created a vast range of plastics and other synthetic materials, which have thousands of uses in the home and in industry. Synthetic materials are easily formed into complex shapes and can be
used to make machine, electrical, and automotive parts, scientific and industrial instruments, decorative objects, containers, and many other items.

Alongside these achievements, science has also brought about technology that helps save human life. The kidney dialysis machine enables many people to survive kidney diseases that would once have proved fatal, and artificial valves allow sufferers of coronary heart disease to return to active living. Biochemical research is responsible for the antibiotics and vaccinations that protect us from infectious diseases, and for a wide range of other drugs used to combat specific health problems. As a result, the majority of people on the planet now live longer and healthier lives than ever before.

However, scientific discoveries can also have a negative impact in human affairs. Over the last hundred years, some of the technological advances that make life easier or more enjoyable have proved to have unwanted and often unexpected long-term effects. Industrial and agricultural chemicals pollute the global environment, even in places as remote as Antarctica, and city air is contaminated by toxic gases from vehicle exhausts. The increasing pace of innovation means those products become rapidly obsolete, adding to a rising tide of waste. Most significantly of all, the burning of fossil fuels such as coal, oil, and natural gas releases into the atmosphere carbon dioxide and other substances known as greenhouse gases. These gases have altered the composition of the entire atmosphere, producing global warming and the prospect of major climate change in years to come.
Science has also been used to develop technology that raises complex ethical questions. This is particularly true in the fields of biology and medicine. Research involving genetic engineering, cloning, and in vitro fertilization gives scientists the unprecedented power to bring about new life, or to devise new forms of living things. At the other extreme, science can also generate technology that is deliberately designed to harm or to kill. The fruits of this research include chemical and biological warfare, and also nuclear weapons, by far the most destructive weapons that the world has ever known.

**Differences between science and religion**

Scientific findings and religious beliefs are normally quite separate; Science deals with the study of nature, its forces, processes and development. It is based on the analysis of empirical evidence. It assumes, as a working hypothesis, that processes and events happen due to natural causes, not through divine intervention. It rarely intrudes in matters of morality, the existence and nature of deity, spirituality, etc, and Religion deals with matters of faith. Its main basis is often revelation from a deity -- orally transmitted from generation to generation, recorded in a sacred text, or revealed to individuals through prayer. Most faith groups teach of the existence of one or more deities who created the universe, and continue to play a major role in managing it -- sometimes bypassing the laws of nature to create miracles. A main function of religion is to teach moral principles, mankind's relationship to the god(s) or goddess (es), behavior towards other humans, spiritual matters, etc. The main battles between religion and science are in areas in which they overlap. Here, both often hold conflicting positions.
Many people feel that their own religious tradition is absolutely true, whereas science and all other faiths are artificial and deeply flawed belief systems, invented by error-prone humans. This attitude often fuels religious conflict, sometimes escalating into mass crimes against humanity and genocide. The result is that different religious traditions battle each other, as well as disagree with the findings of science.

**SCIENCE AND RELIGION; FROM CONFLICT TO CONVERGENCE**

The history of human intellectual development in western civilization reveals that human consciousness has grown through three different stages of evolution. The early Greek civilization was dominated by philosophy which was characterized by the theme of reason. Still its final objective is to reach the ultimate Reality through the mediation of pure reason.

The middle Ages were dominated by religion, which stood on the strong foundations of faith and belief.

The Post – Renaissance period is dominated by science, which seeks to reach at concrete facts. The history of human thoughts further reveals that there has been constant conflict between the devotees of religion, philosophy and science. It goes without saying that religion and science appear to be perfect strangers. They are totally different world views and their outlook on life and of life mostly antagonistic and conflicting.

Philosophical discussion of the relation between modern science and religion has tended to focus on Christianity, because of its dominance
in the West. The relations between science and Christianity have been too complex to be described by the ‘warfare’ model popularized by A.D. White (1896) and J.W. Draper (1874). An adequate account of the past two centuries requires a distinction between conservative and Liberal positions. Conservative Christians tend to see theology and science as partially intersecting bodies of knowledge. God is revealed in ‘two books’: the Bible and nature. Ideally, science and theology ought to present a single, consistent account of reality; but in fact there have been instances where the results of science have (apparently) contradicted Scripture, in particular with regard to the age of the universe and the origin of the human species.

Liberals tend to see science and religion as complementary but non-interacting, as having concerns as different as to make conflict impossible. This approach can be traced to Immanuel Kant, who distinguished sharply between pure reason (science) and practical reason (morality). More recent versions contrast science, which deals with what and how of the natural world, and religion, which deals with meaning, or contrast science and religion as employing distinct languages. However, since the 1960s a growing number of scholars with liberal theological leanings have taken an interest in science and have denied that the two disciplines can be isolated from one another.

Topics within science that offer fruitful points for dialogue with theology include Big-Bang cosmology and its possible implications for the doctrine of creation, the ‘fine-tuning’ of the cosmological constants and the possible implications of this for design arguments, and evolution and genetics, with their implications for a new understanding of the human individual.
Perhaps of greater import are the indirect relations between science and theology. Newtonian physics fostered an understanding of the natural world as strictly determined by natural laws; this in turn had serious consequences for understanding divine action and human freedom. Twentieth-century developments such as quantum physics and chaos theory call for a revised view of causation. Advances in the philosophy of science in the second half of the twentieth century provide a much more sophisticated account of knowledge than was available earlier, and this has important implications for methods of argument in theology.

1- Religion and Western predecessors of science: Western interest in a systematic account of the natural world is an inheritance from the ancient Greeks rather than from the Hebrew tradition, which tended to focus on the human world. The Greek concept of nature was not set over against a concept of super nature, as it has been in more recent centuries, so it is possible to say that Greek philosophy of nature was inherently theological. Early Christian scholars were divided in their approach to Greek natural philosophy, some making great use of it for apologetic purposes, others rejecting it.

After the fall of Rome, the centre of scholarship shifted eastward. Islamic scholars in the Middle Ages were largely responsible for preserving the learning of the Greeks, as well as for significant scientific developments of their own in the fields of optics, medicine, astronomy and mathematics. It was through Muslims in Spain that important scientific works by Aristotle were introduced to Western Europe in the twelfth century. The influence of these works on Christian thought culminated in Thomas Aquinas' 'Two Summas'.
2- Early modern science and worldview: At the end of the nineteenth century, White (1896) and Draper (1874) promoted the view of science and religion as traditional enemies. However, evisionist history at the end of the twentieth century presents a much more complex picture. It is true that the Catholic Church silenced Galileo in 1633, while René Descartes' mechanics conception of matter was condemned, and that fear of censorship had a generally chilling effect on scientific theorizing throughout the seventeenth century. However, it must be noted that not all of the Catholic officials were opposed to Galileo. In addition, a number of the century's greatest scientists were Catholic: Pierre Gassendi, Marin Mersenne, Blaise Pascal and Nicolas Steno, as well as Galileo and Descartes. The Jesuit order was home to a number of scientists who were not outstanding theorists but contributed significantly to experimental science.

In the early modern period, it is difficult to distinguish conflicts between science and religion on the one hand from intra-theological conflicts and conflicts between the new science and the Aristotelian scholastic synthesis on the other. The Galileo affair needs to be interpreted in the light of both these complications, since it is not possible to understand the resistance to Galileo's astronomy without recognizing the fact that it called into question an entire socio-political order founded on a picture of the cosmos and of the place of humans in it. The affair was also an internal church struggle concerning the proper interpretation of Scripture. Galileo followed Augustine's rule that an interpretation of Scripture should be revised when it is found to conflict with other knowledge. This put him in conflict with conservative church officials who adopted a more literalist interpretive strategy. A further complication is the fact that the new science was often liberally mixed with magic and
astrology, which the Catholic Church condemned both because they
dabbled with the demonic and because of suspicion that they confirmed
Calvinist views of determinism against the Catholic view of free will.

Robert Merton (1938) argued that Puritanism promoted the
scientific revolution, a thesis still debated over half a century later. While
Merton’s thesis was overstated, it is likely that a particular reformed
document of the sovereignty of God - that God’s sovereignty excludes all
active contributions of lesser beings to his work - made the modern
scientific and philosophical conception of matter as inert or passive more
acceptable to Isaac Newton, Robert Boyle and other Protestants than it
would otherwise have been. Here again it is important to recognize the
interplay of Aristotelians and intra-theological disputes. The mechanics
conception of matter was a direct rejection both of Neo-Platonist magical
conceptions and of the Aristotelian teleological and organic view, that
‘forms’ inherent in substances provided built-in powers and goals . At the
same time, it furthered theological convictions first expressed by late
medieval nominal theologians. It is one of the great ironies of history,
then, that Newton’s mechanics conception of the material universe so
quickly evolved into Pierre Simon de Laplace’s purely materialist and
determinist view, the latter being absolutely incompatible with religion.

3-Indirect relations: If direct conflicts between Christian theology and
the various theories of modern science have often been overemphasized,
the deleterious effects on theology of indirect conflicts between religion
and science have received too little attention. These indirect interactions
can be considered under the headings of metaphysics and epistemology.

Metaphysics; Descartes’ mechanics’ view of matter as pure extension,
accompanied by a view of mind as ‘thinking substance’, inaugurated a
metaphysical dualism that has replaced older and more nuanced views of
Christian anthropology. In so far as this dualism has been shown to be philosophically untenable, Christianity, with its view of the soul and afterlife, has appeared untenable as well.

The clockwork image of the universe as a closed system of particles in motion, strictly governed by the laws of physics (the image epitomized in the nineteenth century by the work of Laplace), created insuperable problems in accounting for divine action. A popular variety of deism offered the most reasonable account: God was the creator of the universe, and responsible for the laws of nature, but has no ongoing interaction with the natural world or with human history. The alternatives for theists were accounts of miraculous interventions or an account of God as an immanent sustainer of natural processes. The former seemed to make God irrational (contradicting God’s own decrees) or inept (needing to readjust the system). The latter view made it difficult to maintain any more sense of God’s personal involvement in human life than was possible for the deists. Much of the difference between liberal and conservative Christianity can be traced to theories of divine action: conservatives tend to take an interventionist, liberals an immanent, view.

**Epistemology:** Medieval theologians had two sets of epistemological categories at their disposal, those relating to scientia (demonstrative or scientific knowledge) and those relating to opinio (‘probable’ beliefs, including those based on authority). So those theological conclusions that could not be deduced from first principles could, happily, be based on unimpeachable authority, the very word of God. However, in the modern period, the range of scientia contracted to the spheres of mathematics and formal logic; Hume and Kant both provided powerful critiques of deductive arguments for the existence of God and of natural theology generally. Furthermore, when probable
knowledge took on its contemporary sense of knowledge based on the weight of empirical evidence, appeals to authority became irrelevant, and most judged it impossible to provide empirical evidence for theological claims. Thus the central question for modern liberal theologians has been how, if at all, theology is possible.

Liberal theology diverged from more traditional accounts as a result of its strategies for meeting the problems raised directly or indirectly by science. Following Friedrich Schleiermacher, many liberal theologians have understood religion to constitute its own sphere of experience, unrelated to that of scientific knowledge. Theological doctrines are expressions of religious awareness, not accounts of a supernatural realm. God works immanently, not by interventions in either the natural world or human history. Thus liberal theology has avoided direct conflict with modern science, at the cost (or with the beneficial consequence) of a radical revision of the very concepts of religion and theology. However, Ian Barbour's *Issues in Science and Religion* (1966) presented an encyclopedic overview of the points at which scientific claims are relevant to religious thought, and in *Myths, Models, and Paradigms* (1974) he argued for significant epistemological similarities between science and religion. Since then, a growing number of scholars from the liberal wing of Christianity have begun to call the modern division of territory into question.

4- **Geology, evolution and the age of the earth:** Physics and astronomy were the main scientific for theologians in the seventeenth and eighteenth centuries; geology and biology held an analogous place in the nineteenth and twentieth. For centuries, the biblical narrative from creation to Christ and the projected Last Judgment provided the skeletal outline for
accounts of natural as well as human history. For instance, the story of Noah and the Flood served as a useful explanation for marine fossils found high above sea level. However, by the seventeenth century, the short span of history calculated from the Bible was being challenged from a number of directions. (James Ussher, a seventeenth-century Irish archbishop, has been credited with the calculation that creation took place a mere 4004 years before Christ.) Although sporadic attempts to reconcile geological history with Genesis continue up to the present, in the eighteenth century a large number of geologists already recognized that the Flood hypothesis could not explain the growing body of knowledge regarding rock stratification and the placement of fossils. A much longer history of the Earth, prior to human history, had to be presumed. At the same time, Egyptian and Chinese records were calling into question the short span of human history calculated from the Bible.

While some contemporary opposition to evolutionary theory involved ‘young earth’ chronology, negative reactions in the nineteenth century to Charles Darwin’s *The Origin of Species* (1859) were more often objections to social Darwinism and to the claim that humans were kin to the ‘lower animals’; other negative reactions focused on the fact that natural selection provided an alternative to divine design for explaining the fit of organisms to their environments, thus undermining an important apologetic argument. Nonetheless, many theologians and other believers readily accepted the theory and judged the changes it required in theology to be salutary rather than mere accommodation.

5-*Biological sciences*: The theory of evolution is a surprisingly hot issue again at the end of the twentieth century. A Gallup poll published in the magazine US News and World Report (December 23, 1991) reported that a majority of North American Christians are skeptical of the macro
evolutionary paradigm: The best explanation for this resistance is probably the fact that the issue has come to be framed in terms of creation versus chance as an account of the origin of the human species. That the issues can be formulated in these terms is due in part to a (defective) theory of divine action that contrasts God’s creative acts with natural processes, rather than allowing that God may work through natural processes, including those that involve random events. The controversy is exacerbated by the use made of evolutionary biology by proselytizing atheists.

Genetics provides a new area for dialogue between religion and the biological sciences. Studies showing a genetic basis for human characteristics and behavior raise questions about the status of the human person - for example, questions about free will and determinism - that have been the province of philosophy and religion. Of particular interest are studies of twins suggesting a genetic factor in religious behavior.

Genetic research in general and genetic engineering in particular have raised a number of ethical questions that relate to theological ethics. For example, while most people favor genetic treatment for illnesses, many are opposed to germ-line intervention, which would affect all succeeding generations.

Some objections are based on quasi-religious positions: scientists should not ‘play God’. This line of thinking calls for theological scrutiny: are not human beings themselves created in order to participate in God’s ongoing creative process? It is noteworthy that in 1991, the US National Institutes of Health awarded its first grant ever to a theological institution to the Center for Theology and the Natural Sciences (Berkeley,
California) to study the theological and ethical implications of the Human Genome Initiative, the project to map human DNA.

6- Cosmologies: Physical cosmology is the branch of science that studies the universe as a whole. Beginning in the 1920s, developments in this field have sparked lively debate at the interface between theology and science. The Big-Bang theory, based on the expansion of the universe and a variety of other data, postulates that the universe originated in an extremely dense, extremely hot “singularity” some 15 to 20 billion years ago. Many Christians, including Pope Pius XII, greeted this theory as a confirmation of the biblical doctrine of creation. It was not only religious people who saw it as such; Frederick Hoyle defended a steady-state model of the universe, in which hydrogen atoms come into being throughout an infinite time span, partly because he saw it as more compatible with his atheism.

The discussion among theologians on the relevance of Big-Bang cosmology to the doctrine of creation involves controversy over the very nature of theology. As mentioned above, it has been common among liberal theologians since Schleiermacher to claim that religious meaning is entirely independent of scientific fact. Theologians who hold this position claim that the doctrine of creation, having to do only with the relation of all that exists to God, says nothing about the temporal origin of the universe, and is therefore equally compatible with any cosmological model.

A more recent area of research that has occasioned theological speculation can be referred to as the issue of the anthropoid principle. A number of factors in the early universe had to be adjusted in a remarkably precise way to produce the universe we have. These factors include the mass of the universe, the strengths of the four basic forces
Calculations show that if any of these numbers had deviated even slightly from its actual value, the universe would have evolved in a radically different manner, making life as we know it - and probably life of any sort - impossible. An example of the ‘fine-tuning’ required is that if the ratio of the strength of electromagnetism to gravity had varied by as much as one part in 10^40, there would be no stars like our sun.

Many claim that this apparent fine-tuning of the universe for life calls for explanation. To some, it appears to provide grounds for a new design argument. Others believe that it can be explained in scientific terms - for example, by suggesting that there are vastly many universes, either contemporaneous with our own or in succession, each of which instantiates a different set of fundamental constants. One or more of these universes would be expected to support life, and it is only in such a universe that observers would be present to raise the question of fine-tuning. Whether or not the fine-tuning is taken as evidence for the existence of God, it has important consequences for theology in that some philosophers believe that it argues against an interventionist account of continuing creation and divine action, since the prerequisites for human existence were built into the universe from the very beginning.

7- Physics and Metaphysics: A variety of developments in physics since the end of the nineteenth century have called into question the determinist worldview. Quantum physics has introduced indeterminacy into the worldview of physics. Quantum theory generally allows only for probabilistic predictions regarding classes of events, not for prediction of individual events. It is unclear whether this limitation represents only a limit of human knowledge, or whether it signifies genuine indeterminacy
in nature. However, scholarly opinion tends towards the latter view. Thus, most physicists reject the determinism of the Newtonian worldview, at least at this level. ‘Quantum non-locality’ refers to the peculiar fact that electrons and other sub-atomic entities that have once interacted continue to behave in coordinated ways, even when they are too far apart for any known causal interaction in the time available. This phenomenon calls radically into question the Newtonian picture of the universe as discrete particles in motion, interacting by means of familiar physical forces. If Newtonian determinism had strong implications for theories of divine action, it is surely the case that these developments in quantum physics must have theological implications as well. What these implications are is still very much an open question.

A more recent development, which cuts across physics and the other natural sciences, is chaos theory. This is the study of systems whose behavior is highly sensitive to changes in initial conditions. What this means can be illustrated with an example from classical dynamics: the movements of a billiard ball are governed in a straightforward way by Newton’s laws, but very slight differences in the angle of impact of the cue stick have greatly magnified effects after several collisions; moreover, initial differences that make for large differences in later behavior are too small to measure, so the system is intrinsically unpredictable. Chaotic systems are found throughout nature – in thermodynamic systems far from equilibrium, in weather patterns and even in animal populations. Chaos theory is relevant to discussions of divine action not because chaotic systems are indeterminate (that is, not causally determined) and thus open to divine action without violation of laws of nature. Rather, the recognition of the ubiquity of chaotic systems
shows the intrinsic limitations of human knowledge, and leads to the negative but important conclusion that one is rarely (or never) in a position to know that God is not acting in natural processes.

Another development throughout science with important implications for the issue of determinism and divine action is the recognition of ‘top-down causation’. The sciences can be conceived as a hierarchy in which higher sciences study progressively more complex systems: physics studies the smallest, simplest components of the universe; chemistry studies complex organizations of physical particles (atoms and molecules); biochemistry studies the extremely complex chemical compounds making up living organisms, and so on. The dream of the logical positivists was to provide an account of the sciences wherein the laws of the higher-level sciences could all be reduced to the laws of physics. This concept of explanatory reductionism followed naturally from the ontological reductionism that has become an important tenet of the modern scientific worldview: if all entities and systems are ultimately made up of the entities studied by physics, their behavior ought to be understandable in terms of the laws of physics. So ontological and explanatory reductionism entail causal reductionism, or ‘bottom-up causation’. If the laws of physics are deterministic, we have a deterministic account of the whole of nature.

However, it has become apparent that the behavior of entities at various levels of the hierarchy of complexity cannot always be understood entirely in terms of the behavior of their parts; attention to their interaction with non-reducible features of their environments is also required. Thus, the state or behavior of a higher-level system exercises top-down causal influence on its components.
Arthur Peacocke (1990) has used this development in scientific thought to propose new directions for understanding divine action. In his ‘panentheist’ view, the universe is ‘in’ God, and God’s influence on the cosmos can then be understood by analogy with top-down causation throughout the hierarchy of natural levels. While this proposal does not answer questions about how God affects specific events within the cosmos, it does dissolve the long-standing problem of causal determinism.

8- Epistemology and Language: The shift from medieval epistemology to modern empiricism required radical revision of religious epistemology. Various strategies were employed during the modern period to show theology to be epistemologically respectable. However, the increasing prevalence of atheism in scholarly circles suggests that these strategies have not been successful. At a point in intellectual history that some would call the end of the modern period, theories of knowledge have changed enough that the question of the epistemic status of theology needs to be examined afresh.

The concern here will be only with changes relating directly to science. Theologians’ statements have sometimes been dismissed on the grounds that they describe states of affairs that are unimaginable or non-picturable.

However, quantum theory and other recent scientific developments describe a physical reality that is equally unimaginable and, some would say, calls into question traditional two-valued logic. This line of argument is intended to point out that a view of knowledge more humble than that of the modern period is called for; reality is more complex and mysterious than anything our language and concepts allow us to capture.
It has often been said (especially by theologians) that theology differs radically from science in that science is objective while all religious knowledge is self-involving, the product of an interaction between God and the human subject. Another way in which science has tempered older views of knowledge, and narrowed the difference between science and theology, is in its recognition that scientific knowledge itself is interactive.

Measurements are interactions with the phenomena being measured, especially at the subatomic level.

Most modern thinkers have judged it impossible to provide empirical support for theology. However, beginning with the work of Ian Barbour (1974), there has been an investigation of the ways in which theological reasoning resembles that of science, including accounts of suitable data for theology. This development was made possible by advances in philosophy of science that show science itself to be a more complicated, and more human, enterprise than the positivists assumed.

9- Religion’s implications for science: Most of this entry has focused on the implications of science for religion. However, it is also the case that religion has implications for science. It has been argued that Christian doctrine was an important contributor to the rise of modern science: God’s freedom entailed that features of the natural world could not be deduced a priori from rational principles, yet God’s goodness and faithfulness suggested that the world would not be so chaotic as to be unintelligible. The very existence of religion is a valuable reminder that there are boundaries beyond which scientific explanation cannot go, and its doctrines help to answer questions that lie beyond those boundaries.
The Newtonian era saw the separation of natural philosophy (science) from natural theology, and since then it has been a methodological presupposition of science that it should provide purely natural explanations.

Science has thereby set boundaries on its own competence, but this does not mean that what is beyond its competence is therefore unimportant (or non-existent). Cosmology and physics raise questions they cannot answer:

Why is the behavior of natural processes law-like? What caused the Big Bang? Why is there a universe at all? While theology and science may interact in minor ways within each of their proper domains, it is here that theological explanation comes into its own.

For further explanation some important viewpoints of either philosophers or scientists about the position of religion will be presented, prior to those types of relationship between religion and science will be discussed.

**Types of relationships**

According to some philosophers and great thinkers\(^{25}\); there are four approaches and ways in which science and religion can be related to each other:

1) **Conflict**: the conviction that science and religion are fundamentally irreconcilable.

2) **Contrast**: the claim that there can be no genuine conflict since religion and science are each responding to radically different questions.

3) **Contact**: an approach that looks for dialogue, interaction, and possible "consonance" between science and religion, and especially for ways in which science shapes religious and theological understanding.
4) **Confirmation:** a somewhat quieter, but extremely important perspective that highlights the ways in which, at a very deep level, religion supports and nourishes the entire scientific enterprise.

   A grasp of these four approaches should help to pass safely through the thicket of issues that make up the subject matter of this thesis.

1. **Conflict:**

   Many scientific thinkers are quite certain that religion can never be reconciled with science. They said, it is hard to imagine how you could honestly also be religious, at least in the sense of believing in God. Their main reason for drawing this conclusion is that religion apparently cannot demonstrate the truth of its ideas in a straightforward way. Whereas science can. Religion tries to sneak by without providing any concrete evidence of God’s existence. Science, on the other hand, is willing to test all of its hypotheses and theories against "experience". Religion cannot do this in a way that is satisfying to an impartial witness, skeptic’s claim, so there must be a "conflict" between the scientific and religious ways of understanding.

   Both historical and philosophical considerations seem to substantiate such a grim verdict. Historically, we need only recall the obvious examples—as it was noted—if the church's persecution of Galileo in the seventeenth century, and the widespread religious and theological aversion to Darwin's evolutionary theory in the nineteenth and twentieth centuries. The slow pace by which religious thought comes to terms with such scientific ideas, and the fact that many theists still have distaste for them, suggest that religion will never get along with science. Since so many believers in God-especially Catholics—have resisted the findings
of astronomy, physics, and biology, is it any wonder that religion comes across as inherently hostile to science?

More important than this historical point, however, are the religion and theology present to scientific skeptics. The main problem here is that religious ideas seem to be experientially attestable. That is, they apparently exempt themselves from the rigors of public examination. If empirical scrutiny shows a scientific hypothesis to be mistaken, then science willingly discards it and tries out alternatives, subjecting these also to the same rigorous process of inspection.

It seems to skeptics that religious teachings are "unfalsifiable."

Karl Popper (1902-1994), argued that genuine science must strive to come up with evidence that will show its ideas to be mistaken. That is, science has to risk the "falsification" of its various claims. For example, since relativity theory predicts that light waves will always bend in the presence of gravitational fields; scientists should look for possible instances in which this prediction might not be true. Then if they cannot find any evidence to the contrary, this means that relativity is a pretty strong theory for weathering all attempts at falsification. Falsifiability is the mark of a theory's scientific status. Willingness to allow its ideas to be falsified purifies science and shows it to be a truly open and honest way of learning about the nature of things.

But can religion display a comparable openness? Scientific skeptics (i.e. those who reject religion in the name of science) declare that religion lacks the robust probity of science. The God-hypothesis, for example, seems to be completely beyond falsification, so it cannot pass muster before the courts of science. Can you imagine any situations and experiences that might lead you to deny God's existence? If you cannot,
then the idea of God must be unfalsifiable—and therefore is not to be taken seriously.

Religion is based, skeptics often claim, on a priori assumptions or "faith", whereas science takes nothing for granted. In addition, religion relies heavily on untamed imagination, whereas science sticks to observable facts. And religion is highly emotional, passionate and subjective, whereas science strives to remain disinterested, dispassionate and objective. These antitheses seem to add up to nothing less than an insuperable mutual hostility between science and religion.

The skeptics are not the only ones to insist that religion clashes with science. Biblical literalists (people who think the words of the Bible are literally true) also often see a conflict between their faith and some well established scientific theories. Whenever scientific ideas do not correspond with the letter of the Bible (which is quite often), biblical literalists argue that science must be wrong and religion right. This is especially the case with regard to evolution, but also with miracles, the creation of the universe, the origin of life, and other issues. Many Christians maintain that the Bible teaches the "true" science and that secular science should be rejected if it does not correspond with the letter of scripture. In addition to biblical literalists, there are still other critics who think that science is the enemy of religion. They argue that it was the coming of science that caused most of the emptiness and meaninglessness in modern life and culture. When science separated the experience of "facts" from our human need for eternal "values" they argue it emptied the cosmos of any real meaning. And since the main business of religion is to teach us the meaning of things, it cannot reconcile with science.
The conflict between religion and science is what naturally occurs to our minds when we think of this subject. It seems as though, during the last half-century, the results of science and the beliefs of religion had come into a position of frank disagreement, from which there can be no escape, except by abandoning either the clear teaching of science or the clear teaching of religion. This conclusion has been urged by controversialists on either side. Not by all controversialists, of course, but by those trenchant intellects which every controversy calls out into the open. In the seventeenth century the doctrine of the motion of the earth was condemned by a Catholic tribunal. A hundred years ago the extension of time demanded by geological science distressed religious people, Protestant and Catholic. And today the doctrine of evolution is an equal stumbling block. These are only a few instances illustrating a general fact. But all our ideas will be in a wrong perspective if we think that this recurring perplexity was confined to contradictions between religion and science and that in these controversies religion was always wrong and science always right. The true facts of the case are very much more complex, and refuse to be summarized in these simple terms. Science is even more changeable than theology. No man of science could subscribe without qualification to Galileo's beliefs, or to Newton's beliefs, or to all his own scientific beliefs of ten years ago. So there are two illustrations, both from science.

Galileo said that the earth moves and that the sun is fixed; the Inquisition said that the earth is fixed and that the sun moves; and Newtonian astronomers, adopting an absolute theory of space, said that both the sun and the earth move. But now we say that any one of these three statements is equally true, provided that you have fixed your sense of 'rest' and 'motion' in the way required by the statement adopted. At the
date of Galileo's controversy with the Inquisition, Galileo's way of stating the facts was, beyond question, the fruitful procedure for the sake of scientific research. But in itself it was not truer than the formulation of the Inquisition. But at that time the modern concepts of relative motion were in nobody's mind, so that the statements were made in ignorance of the qualifications required for their more perfect truth. Yet this question of the motions of the earth and the sun expresses a real fact in the universe, and all sides had got hold of important truths concerning it. But, with the knowledge of those times, the truths appeared to be inconsistent.

2. Contrast:

Many scientists and theologians, on the other hand, find no such opposition between religion and science. Each is valid, they argue, though only in its own clearly defined sphere of inquiry. We should not judge religion by the standards of science, nor vice versa, because the questions each asks are so completely disparate, and the content of their answers so distinct, that it makes no sense to compare them with each other. If religion and science were both trying to do the same job, then they might be incompatible, but they have radically dissimilar tasks, and if we just keep them in their separate jurisdictions, preventing them from invading each other's territory, there can never be any real "problem" of science and religion.

According to this "contrast" approach, the impression that religion conflicts with science is almost always rooted in a previous confusion, or "conflation" of science with either a religious or a secular belief system. To avoid conflict then the contrast into an undifferentiated
smudge, it was, after all, the inability of medieval theology to distinguish religion clearly from science that made Galileo's ideas seem so hostile to believers in the seventeenth century. The church's failure to acknowledge the separate domains of science and religion led its officials to condemn Galileo's novel ideas as though they were an invasion of their own territory. This, of course was a most unfortunate misunderstanding, leading as did too much of the hostility that many scientists still feel toward religion.

However, we should now know better: religion and science have no business meddling in each other's affairs in the first place. To avoid possible combat, our second approach claims, we should carefully contrast science with religion. Science and religion are such completely independent ways of understanding reality that it is meaningless to place them in opposition to each other.

Conflation, in this view, is an unsatisfactory attempt to avoid conflict by carelessly commingling science with belief. Instead of respecting the sharp differences between science and religion, conflation weaves them into a single fabric where they fade into each other, almost to the point of becoming indistinguishable. Today, for instance, many conservative Christians argue that since the Bible is divinely inspired and inerrant, it gives us the most reliable scientific information about beginnings of the universe and life. Some of them call their fusion of science and belief "creation science" and they renounce the Darwinian theory of the evolution, favor of a literalist interpretation of the biblical accounts of the world's creation. They insist that since the biblical stories are "scientific" they should be taught in public schools as the best alternative to evolutionary biology.
In any case, two things can be opposed to each other only if they are playing the same game. For example, it makes no sense to compare a move in chess, either favorably or unfavorably, with a play in baseball. A completely disparate set of rules governs each game, and so it is senseless to say that one is better than the other. Likewise, since science and religion do not belong on the same playing field together, there is no point in comparing one with the other. We should not place them in competition or conflict, advocates of this approach typically emphasize that the "game" science plays is one examining the natural world empirically, while religion's is that of expressing the ultimate meaning that transcends the empirically known world. Science is concerned with how things happen in nature, religion with why there is anything at all rather than nothing. Science is about causes, religion about meaning. Science deals with solvable problems, religion with unsolvable mystery. Science answers specific questions about the workings of nature, whereas religion expresses concern about the ultimate ground of nature. Science is concerned with particular truths; religion is interested in explaining why we should seek truth at all.

Where many theologians allow for clear logical distinctions between the tasks of science and religion, the contrast approach sees such differences as a reason for sharply segregating the two. Only by drawing an unbroken line between them can we avoid the conflation that leads to conflict. Contrast envisages science and religion as independent, autonomous ways of knowing. Only by putting them in separate camps, it insists, can we prevent eventual warfare between them. And so it holds that the whole ugly affair between Galileo and the church could have been avoided if theology had not intruded into an area that today we would cede to science alone.
Many theologians and scientists are understandably attracted to it because it seems to keep everything so clean, allowing us to embrace both the discoveries of science and the beliefs of religion without any fear of possible antagonism.

3. Contact

The method of contrast may be an important step toward clarity, but it still fails to satisfy those who seek a more unified picture of reality. As Ian Barbour would say, it is helpful first approximation, but contrast leaves things at a frustrating impasse. The urge to discover the coherence of all our ways of knowing is too powerful for us to suppress indefinitely, and so it could be suggested that we consider a third approach, one that we shall simply call *contact*.

This way of relating religion to science is not willing to leave the world divided into the two realms defined by the contrast position. Yet it does not wish to revert to the superficial harmony of conflation either. It agrees that science and religion are logically and linguistically distinct, but it knows that in the real world they cannot be as easily compartmentalized as the contrast position supposes. After all, religion in the west has helped shape the history of science, and scientific cosmology has in turn influenced theology. It is impossible to separate them completely even though we can try to make clear logical distinctions in our definitions of them.

In addition, it seems unlikely that just any old cosmology will be compatible with just any old theology, as the contrast position would seem to allow. The kind of world described by evolutionary biology and big bang physics for example, cannot peacefully coexist with the
picture of God that Newton, Descartes, and perhaps even Thomas, Aquinas idealized. Whether they are aware of it or not, theologians always bring at least implicit cosmological assumptions to their talk about God, and it is only honest that they acknowledge this fact. It often happens; however, that their cosmological assumptions are scientifically out of date. The contact approach, therefore, is concerned that theology always remains positively "consonant" with cosmology.

Theology cannot rely too heavily on science, but it must pay attention to what is going on in the world of scientists. It must seek to express its ideas in terms that take the best of science into account lest it become intellectually irrelevant.

For this reason, the contact approach looks for an open-ended conversation between scientists and theologians. The term "contact" implies coming together without necessarily fusing. It allows for interaction, dialogue, and mutual impact but forbids both conflation and segregation. It insists on preserving differences, but it alsocherishes relationship.

Contact proposes that scientific knowledge can broaden the horizon of religious faith and that the perspective of religious faith can deepen our understanding of the universe. It does not strive to prove God's existence from science but is content simply to interpret scientific discoveries within the framework of religious meaning. It does not seek to shore up religious doctrines by appealing to scientific concepts that may on the surface seem to point directly to a divine designer. The days in which scientific ideas could be used to seal
arguments for God's existence are over. Still, it is convinced that, without in any way interfering with scientists' own proper methods, religious faith can flourish alongside of science in such a way as to co-produce with it a joint meaning that is more illuminating than either can provide on its own. The kind of religion we are discussing in this work, for example, characteristically strives to instill in its followers a special way of looking at things, and this perspective, as it turns out, is ideally suited to frame recent developments in biology and physics. Rooted in the story of Abraham, the prophetic faith traditions invite their followers to look for the promise that lies in all things. Judaism, Christianity, and Islam think of genuine "faith" as a confidence that new life and undreamed of possibilities are latent even in the most desperate of situations. The authentic religious attitude, then, is a steadfast conviction that the future is open and that an incalculable fulfillment awaits the entire cosmos.

Any way, it should be mentioned here that in recent philosophical discussions of the nature of science, the ways of science and theology do not appear nearly as divergent as rather the conflict or the contrast position insinuates. Science no longer appears quite so pure and objective as we used to think, nor theology so impure and subjective. Both science and theology generate imaginative metaphors and theories to interpret certain kinds of "data" but in neither case is it always clear just where metaphor or theory leaves off and "fact" begins. Indeed the consensus of philosophers is that there are no uninterrupted facts. And so we are now more aware than ever before that in both science and theology there is an aspect of human "construction" which we previously failed to notice. This does not mean that our ideas are therefore inevitably unobjective, but it does
mean that we cannot enshrine as absolutely unreliable any particular forms of expression that we employ in our quest for truth.

Science and religion make meaningful contact with each other, therefore, only when they agree to play by the rules of what we are calling critical realism. Good science, in this covenant, hopes to approximate, more or less, the way things are in nature, but it is always willing to be critical of its ways of representing the world. And a theological method committed to the same principles of critical realism allows that our religious symbols and ideas are also always in need of constant correction, but that in a finite way they too may point towards a Transcendent Reality, one that is infinitely elusive but also always truly "there".

Scientific theories and religious metaphors, in this epistemological contract, are not just imaginative concoctions, as much modern and postmodern thought asserts. Rather, they bear an always tentative relationship to a real world and its ultimate ground. This world beyond our representations is always only incompletely grasped, and its presence constantly "judges" our hypotheses, inviting us continually to deepen our understanding both in science and religion. So it is their mutual sharing in this critical openness to the real that provides the basis for genuine "contact" between science and religion.

4. Confirmation

The confirmation approach may be stated as follows; religion's claim that the universe is a finite, coherent, rational, ordered totality, grounded in an ultimate love and promise, provides a general vision of things that
consistently nurtures the scientific quest for knowledge and liberates science from association with imprisoning ideologies.

Science, to be more specific, cannot even get off the ground without rooting itself in a kind of a priori "faith" that the universe is a rationally ordered totality of things. Scientists always rely on a tacit faith (which they seldom reflect on explicitly conscious way) that there is a real world that hangs together intelligibly, that the human mind has the capacity to comprehend at least some of the world's intelligibility, and that no matter how far we investigate, there will still be further intelligibility to uncover. Without this kind of trust there could be no incentive to look for the order present in nature or to keep looking deeper into the specifics of this order.

Thus it seems that "faith", in the sense of basic trust in the limitless rationality of real, is not opposed to science but is its very wellspring. Science, like all human knowing, has what some philosophers call a "fiduciary" aspect (from the Latin fideo, to trust). Without this element of trust there would be no incentive to pursue the truth through science in the first place.

It would be more cautious not to let religion intrude into the actual work of science, but it is better to say that religion does provide confirmation of the trusting that inevitably underlies science. Religion cannot add anything to the list of scientific discoveries and is much more intimately connected to the epistemological roots of scientific inquiry than the other approaches have enunciated.
Religion, taken as a confirmation of the faith assumptions out of which science springs, and not as an alternative source of scientific hypotheses, will not obstruct, but only encourage, the work of science.

Religion comes about in human culture because of our awareness of the fact that trust can fail, and its central mission is continually to revive this trust. It does not initiate our trust, since a capacity to trust in reality seems native to us, but instead functions to revive our trust when it fails.

There are any numbers of experiences that can lead us to doubt the intelligibility of the universe.

The point of religion, though, is to encourage us to trust anyway. It seeks to restore our hope in the face of despair, to help us adhere to the conviction that there is a final meaning and promise that can light up even those experiences that seem to make the universe absurd. The word "God" points us toward this mysterious meaning and promise, towards that which guarantees the word's ultimate coherence and trustworthiness.

Religious symbols, stories, and teachings persuade us that there is an infinitely wider perspective than our own, and that our own minds are not encompassing enough to take in the whole horizon of being at any given moment, but that nonetheless things do make sense in terms of an continually to press onward, beyond the narrowness of current understanding, and go in search of this transcending breadth and depth.

Religion, invites us to assume a posture of trust in the ultimate intelligibility of things. Abandoning ourselves to such trust, it then does
not lead us into conflict with science but instead prepares our consciousness for the journey of scientific discovery.

"Confirmation" goes further than the "contact" approach by attaching itself directly onto the faith that scientists have to possess as they embark on their forays into the world's endless intelligibility. The place to locate religion in relation to scientific conversation, therefore, is not as the answer to specific scientific questions (since this would be conflation), but as a response to the source question concerning why we should go forth on the adventure of truth-seeking in the first place. The business of religion is not to place itself alongside of science as a competing set of answers to scientific questions, but to confirm the scientist's trust in reality's coherence.

In this section, an attempt is made to clarify the relationship of religion to science and avoid both unnecessary conflation and dualism if we keep to the view that religious expression is most appropriately concerned with grounding our trust, not with solving scientific questions. The implications of religion for science are much more radical, intimate, and nourishing than the other three approaches have allowed us to see.
THREE ILLUSTRATIVE EXAMPLES OF CLASH;  
Galileo, Marx & Darwin

1. Galileo’s (1564-1642) view and Christian scriptures

As we noted earlier, there are broadly speaking two ways of looking at the relationship between science and religion (the conflict and the harmony), there are also two ways to approach historical episodes. One way is to start, from the outset, with either a harmony or a conflict model in place, being convinced, for example, that there is a harmony between science and religion; and then to turn to the case in question and attempt to read everything in terms of that position. The alternative is to begin with an open mind in regard to which model is correct, being thereby free to approach the episode as a way to determine which model is correct. (There are also shades of grey between these two alternatives.)

In Galileo there is a bold commitment to the idea of unity (that there is one God behind both Scripture and nature). For Galileo, the same God who created the things that we discover through science also wrote all of the Scriptures.

He did not ignore the Bible, but he knew very well that if his doctrine were proved, then it could not contradict the Scripture when they were rightly understood.

The assumption of unity leads Galileo to a harmonious view of the relation between religion and science: since there is one God behind the book of nature and the book of Scripture, then there is a harmony
between true science and true religion, once science is properly proved, and Scripture properly interpreted. If we begin from the presupposition of unity, then it is inevitable that we will be led to a metaphoric interpretation of anything that apparently contradicts what we are learning in the new science. His type of argument is valid; but since it begins from the presupposition of unity, it does nothing to answer the question about which is the appropriate way to approach these episodes.

The neutrality principle of Galileo and Calvin guarantees harmony by insulating religion from scientific advances; via the blanket understanding that Scripture teaches us how to go to heaven, not how the heavens go. Neutrality is an independence view of the relation between science and religion, offering a global recipe for reading Scripture. However, this is not simply response to new developments in science, invented to avoid the Church's censure. It is rather the natural outworking of a fundamentally religious and universally unquestioned view of the world: that one and the same mind created the world and wrote Scripture.  

There is another example is taken from the state of modern physical science, since the time of Newton and Huygens in the seventeenth century there have been two theories as to the physical nature of light. Newton's theory was that a beam of light consists of a stream of very minute particles, or corpuscles, and that we have the sensation of light when these corpuscles strike the retinas of our eyes. Huygens's theory was that light consists of very minute waves of trembling in all-pervading ether, and that these waves are traveling along a beam of light. The two theories are contradictory. In the eighteenth century Newton's
theory was believed, in the nineteenth century Huygens's theory was believed.

2. Karl Marx (1818-1883) & Religion

According to Karl Marx, religion is like other social institutions in that it is dependent upon the material and economic realities in a given society. It has no independent history; instead it is the creature of productive forces. As Marx wrote, “The religious world is but the reflex of the real world.”

According to Marx, religion can only be understood in relation to other social systems and the economic structures of society. In fact, religion is only dependent upon economics, nothing else — so much so that the actual religious doctrines are almost irrelevant. This is a functionalist interpretation of religion: understanding religion is dependent upon what social purpose religion itself serves, not the content of its beliefs.

Marx's opinion is that religion is an illusion that provides reasons and an excuse to keep society functioning just as it is.

Much as capitalism takes our productive labor and alienates us from its value, religion takes our highest ideals and aspirations and alienates us from them, projecting them onto an alien and unknowable being called a god.

Marx has three reasons for disliking religion. First, it is irrational — religion is a delusion and a worship of appearances that avoids recognizing underlying reality. Second, religion negates all that is
dignified in a human being by rendering them servile and more amenable to accepting the status quo. In the preface to his doctoral dissertation, Marx adopted as his motto the words of the Greek hero Prometheus who defied the gods to bring fire to humanity: “I hate all gods,” with addition that they “do not recognize man’s self-consciousness as the highest divinity.”

Third, religion is hypocritical. Although it might profess valuable principles, it sides with the oppressors. Jesus advocated helping the poor, but the Christian church merged with the oppressive Roman state, taking part in the enslavement of people for centuries. In the Middle Ages the Catholic Church preached about heaven, but acquired as much property and power as possible. Martin Luther preached the ability of each individual to interpret the Bible, but sided with aristocratic rulers and against peasants who fought against economic and social oppression. According to Marx, this new form of Christianity, Protestantism, was a production of new economic forces as early capitalism developed. New economic realities required a new religious superstructure by which it could be justified and defended.

Marx’s most famous statement about religion comes from a critique of Hegel’s Philosophy of Law:

Religious distress is at the same time the expression of real distress and the protest against real distress. Religion is the sigh of the oppressed creature, the heart of a heartless world, just as it is the spirit of a spiritless situation. It is the opium of the people.
The abolition of religion as the illusory happiness of the people is required for their real happiness. The demand to give up the illusion about its condition is the demand to give up a condition which needs illusions.

This is often misunderstood, perhaps because the full passage is rarely used: the boldface in the above is my own, showing what is usually quoted. The italics are in the original. In some ways, the quote is presented dishonestly because saying “Religion is the sigh of the oppressed creature...” leaves out that it is also the “heart of a heartless world.” This is more a critique of society that has become heartless and is even a partial validation of religion that it tries to become its heart. In spite of his obvious dislike of and anger towards religion, Marx did not make religion the primary enemy of workers and communists. Had Marx regarded religion as a more serious enemy, he would have devoted more time to it.

Marx is saying that religion is meant to create illusory fantasies for the poor. Economic realities prevent them from finding true happiness in this life, so religion tells them this is ok because they will find true happiness in the next life. Marx is not entirely without sympathy: people are in distress and religion does provide solace, just as people who are physically injured receive relief from opiate-based drugs.

The problem is that opiates fail to fix a physical injury — you only forget your pain and suffering. This can be fine, but only if you are also trying to solve the underlying causes of the pain. Similarly, religion does not fix the underlying causes of people's pain and suffering — instead, it helps them forget why they are suffering and causes them to look forward
to an imaginary future when the pain will cease instead of working to change circumstances now. Even worse, this “drug” is being administered by the oppressors who are responsible for the pain and suffering.

Karl Marx wrote that religion was, “an opiate of the people.” Although those words were not published in The German Ideology, they best describe his various views on religion. Marx wrote that there was a social relationship between the upper class or bourgeoisie and religion. The upper class that owned the means of production used religion as a tool to keep the working class or proletariat, oppressed and poor. Marx criticized that religion had so many ulterior motives that there was no actual spiritual meaning. He argued that religion existed because of the state of society and its class struggles. The existence of religion also helped to limit or avoid change in society. Marx also believed that religion stripped us of our true humanity. “It is self-evident, moreover, that "specters", "bonds", "the higher being", "concept", "scruple", are merely the idealistic, spiritual expression, the conception apparently of the isolated individual, the image of very empirical fetters and limitations, within which the mode of production of life and the form of intercourse coupled with it move.” God or any higher power was something invented to deposit fear into. God was something to blame for our own inefficiencies and failures. He also wrote that humans give too much credit to God for their own accomplishments.37

Is Religion the Opiate of the Masses?

This quote is reproduced a great deal and is probably the only Marx quote that most people are familiar with. Unfortunately, if someone is familiar with it they are likely only familiar with a small portion that,
taken by it, tends to give a distorted impression of what Marx had to say about religion. 

Religious distress is at the same time the expression of real distress and the protest against real distress. Religion is the sigh of the oppressed creature, the heart of a heartless world, just as it is the spirit of a spiritless situation. It is the opium of the people. The abolition of religion as the illusory happiness of the people is required for their real happiness. The demand to give up the illusion about its condition is the demand to give up a condition which needs illusions.

It [religion] presents man to himself in terms which distort the true ideal of human liberation and conceal the misery of his actual condition. Usually all one gets from the above is “Religion is the opium of the people” (with no ellipses to indicate that something has been removed).

Sometimes “Religion is the sigh of the oppressed creature” is included. If you compare these with the full quotation, it is clear that a great deal more is being said than what most people are aware of.

In the above quotation, Marx is saying that the purpose of religion is to create illusory fantasies for the poor. Economic realities prevent them from finding true happiness in this life, so religion tells them that this is ok because they will find true happiness in the next life. Although this is a criticism of religion, Marx is not without sympathy: people are in distress and religion provides solace, just as people who are physically injured receive relief from opiate-based drugs.
The quote is not, then, as negative as most portray (at least about religion). In some ways, even the slightly extended quote which people might see is a bit dishonest because saying “Religion is the sigh of the oppressed creature...” deliberately leaves out the additional statement that it is also the “heart of a heartless world.”

What we have is a critique of society that has become heartless rather than of religion which tries to provide a bit of solace. One can argue that Marx offers a partial validation of religion in that it tries to become the heart of a heartless world. For all its problems, religion doesn’t matter so much — it is not the real problem. Religion is a set of ideas, and ideas are expressions of material realities. Religion is a symptom of a disease, not the disease itself.

Still, it would be a mistake to think that Marx is uncritical towards religion — it may try to provide heart, but it fails. For Marx, the problem lies in the obvious fact that an opiate drug fails to fix a physical injury — it merely helps you forget pain and suffering. This may be fine up to a point, but only as long as you are also trying to solve the underlying problems causing the pain. Similarly, religion does not fix the underlying causes of people’s pain and suffering — instead, it helps them forget why they are suffering and gets them to look forward to an imaginary future when the pain will cease.

Even worse, this “drug” is administered by the same oppressors who are responsible for the pain and suffering in the first place. Religion is an expression of more fundamental unhappiness and symptom of more fundamental and oppressive economic realities. Hopefully, humans will create a society in which the economic conditions causing so much pain
and suffering would be eradicated and, therefore, the need for soothing drugs like religion will cease. Of course, for Marx, such a turn of events is not to be "hoped for" because human history was leading inevitably towards it.

So, in spite of his obvious dislike of and anger towards religion, Marx did not make religion the primary enemy of workers and communists, regardless of what might have been done by 20th century communists. Had Marx regarded religion as a more serious enemy, he would have devoted more time to it in his writings. Instead, he focused on economic and political structures that in his mind served to oppress people.

For this reason, some Marxists could be sympathetic to religion. Karl Kautsky, in his Foundations of Christianity, wrote that early Christianity was, in some respects, a proletarian revolution against privileged Roman oppressors. In Latin America, some Catholic theologians have used Marxist categories to frame their critique of economic injustice, resulting in "liberation theology."

Marx’s relationship with and ideas about religion are more complex than most realize. Marx’s analysis of religion has flaws, but despite them his perspective is worth taking seriously. Specifically, he argues that religion is not so much an independent "thing" in society but, rather, a reflection or creation of other, more fundamental "things" like economic relationships. That is not the only way of looking at religion, but it can provide some interesting illumination on the social roles that religion plays. He opposed religion because it is a counter revolutionary force, i.e., it is a conservative force within society that mitigates against social
change. Religion supports the status quo on two grounds: it consoles the proletariat; in addition, it justifies the position of the capitalist bourgeoisie. Religion is on the Marx's view as the opiate of the masses and religious suffering is at the same time an expression of real suffering. Religion is the sign of the oppressed creature, the sentiment of a heartless world, and the soul of soulless conditions. It is the opium of the people. The abolition of religion as the illusory happiness of men, is a demand for their real happiness. The call to abandon their illusions about their condition is a call to abandon a condition which requires illusions. The criticism of religion is, therefore, the embryonic criticism of this value of tears of which religion is the halo. He said also that; religion for capitalist class justifies their position of privilege (e.g., it is God's will/plan).

Religion undercuts the revolutionary urge of the proletariat, thus preserving the capitalist's position of privilege. Religion provides rationalizations for the existing class system (e.g., laws of Karma).

Marx's view of God draws on German theologian Feuerbach; God is a projection of man's own qualities and powers.

Theology is nothing other than a mystified form of anthropology, thus, when one speaks of God as knowledge, wisdom, and love, one is speaking of man's own powers.

**Criticisms in Karl Marx's Analysis of Religion in his Theory**

Turning to the causes of the emergence of secularism in the West, Now, why is it that secularism came into being in the West from the 16th century onwards, whereas it did not develop in the world of Islam and in
the East as a whole? What was the factor behind the growth of secularism in the West? First and foremost, According to Dr. Soroush (Iranian thinker) it has to say in this connection that secularism had a natural birth in the West. In other words, it was an infant that spent the appropriate length of time in the womb of the West’s history and, when it had reached its full term, it came into this world; its birth was not accompanied by a Caesarean section and bleeding. We can attribute this to two causes. The first cause was the confrontation and clash between science and religion. The quarrel between science and religion was a very fateful quarrel in the history of Europe. And it was not a product of a conspiracy, ill will, malice or religiosity. In fact, it was a very natural quarrel: there was growth in the natural sciences, in geology, biology, astronomy. And new information came to light that was in conflict with the contents of Scripture and the conflict intensified to the point where it became impossible to hide or deny. There was Copernicus, Kepler, Galileo and Newton and, later, Buffon and Darwin.

Some of these people were religious themselves. As it happens, Galileo was a religious man. Copernicus was once a priest. Kepler was someone who had gone several steps beyond the common religion of the masses to the point of being superstitious. But the product of these people’s work was something that was not in any way in keeping with the contents of Scripture, especially on the subject of the motion of the earth and the sun and the planets. The Church tolerated these ideas for a while but, then, the quarrel flared up. The status that the Church and Scripture acquired thereafter never went back to what it had been before the quarrel. In all fairness, despite all its hostility towards science, the Church did not go down the path of fanaticism. The Church allowed the publication of Copernicus’s book. In The Revolutions of the Heavenly
Spheres, Copernicus explicitly stated that the earth was in motion and that
the sun was still, whereas, according to Scripture, it was the sun that
 moved and the earth that was still. From the 400 copies of the book that
were published in the 16th century, 200 still exist today. The tales about
Galileo having been put to death are all untrue. Of course, they did put
Galileo under house arrest. The Church allowed the publication of
Copernicus’s book but wrote an introduction to it. And the important
point that was made in this introduction was “what is stated in this book
is a theory and not the absolute truth”. This was a laudable and sensible
solution. The big and small discoveries that were being made here and
there gradually robbed Scripture of the status that it had had heretofore.
Religion lost its former power and status and, from then on, it was no
longer the actor on the social and political stage that it had been before.
As long as religion was strong, it was in the political arena. When faith
diminished and religion’s status declined, this actor ended up playing a
smaller role. It was not as if anyone evicted religion from the political
stage; it just grew weaker and moved to the sidelines. It was a natural
birth. The political stage is for powerful players. When religion was
strong, there was no need for anyone to invite religion onto the political
stage. And, when it grew weak, it inevitably left the stage; there was no
need for anyone to evict it.

The second cause was the rupture that occurred in Christianity; that
is to say, the birth of Protestantism from the ribs of Catholicism. This
Protestantism reduced the Church’s strength; in fact, it stood exactly
opposite the Church. Martin Luther was the first person to translate the
Bible into German. And he said that everyone was his or her own priest
and he rejected the authority of the Church.
These two events together weakened the Christian Church so that it departed from the game of power, and this departure meant that there was now a separation between religion and the State. Some people imagine that, in European countries, some people drew up Constitutions stating that, henceforth, there must be a separation between religion and politics. This was not at all the case. The fact that this has been stated in European Constitutions was the effect of this development, not its cause. At any rate, the secularism that was born was a tolerant secularism. It was not militant. Since it knew that religion was weak, it felt no need to attack it. As recently as about 30 or 40 years ago, many sociologists were of the view that not just Christianity but all religions were on the decline. They believed that history was moving in the direction of political secularism. So, what do you do when faced with weaklings? You are tolerant and you tell yourself that they pose no danger, they are doing no harm, let them have their mosque or church, let them observe their rituals. Secularism proceeded on the assumption that it should be neutral towards religions and view them all in the same light. As far as secularism is concerned, it makes no difference that there are Christians, Muslims, Jews and/or Zoroastrians in society, because it assumed that they were all being left behind by history.

Secularism in this sense both led to the separation of religion and the State and adopted a neutral approach to religions. Former US Secretary of State Colin Powell said with pride: “In the US now, you can see mosques and synagogues alongside churches, and they are all coexisting peacefully.” And, in fact, this is something to be proud of and it is a very laudable situation.
As interesting and insightful as Marx’s analysis and critiques are, they are not without their problems — historical and economic. Because of these problems, it would not be appropriate to accept Marx’s ideas uncritically. Although he certainly has some important things to say on the nature of religion, he can’t be accepted as the last word on the subject.

First, Marx does not spend much time looking at religion in general; instead he focuses on the religion with which he is most familiar: Christianity. His comments do hold for other religions with similar doctrines of a powerful god and happy afterlife, they do not apply to radically different religions. In ancient Greece and Rome, for example, a happy afterlife was reserved for heroes while commoners could only look forward to a mere shadow of their earthly existence.

Perhaps he was influenced in this matter by Hegel, who thought that Christianity was the highest form of religion and that whatever was said about that also automatically applied to “lesser” religions — but that isn’t true.

A second problem is his claim that religion is wholly determined by material and economic realities. Not only is nothing else fundamental enough to influence religion, but influence cannot run in the other direction, from religion to material and economic realities. This is not true. If Marx were right, then capitalism would appear in countries prior to Protestantism because Protestantism is the religious system created by capitalism — but we don’t find this. The Reformation comes to 16th century Germany which is still feudal in nature; real capitalism doesn’t appear until the 19th century. This caused Max Weber to theorize that religious institutions end up creating new economic realities. Even if
Weber is wrong, we see that one can argue just the opposite of Marx with clear historical evidence.

Marxists have tried valiantly to refute those critiques or revise Marx’s ideas to render them immune to the problems described above, but they haven’t entirely succeeded (although they certainly disagree — otherwise they wouldn’t still be Marxists).

We do not have to restrict ourselves to the idea that religion is only dependent upon economics and nothing else, such that the actual doctrines of religions are almost irrelevant. Instead, we can recognize that there are a variety of social influences upon religion, including economic and material realities of society. By the same token, religion can in turn have an influence upon society’s economic system.

Whatever one’s final conclusion about the accuracy or validity of Marx’s ideas on religion, we should recognize that he provided an invaluable service by forcing people to take a hard look at the social web in which religion always occurs. Because of his work, it has become impossible to study religion without also exploring its ties to various social and economic forces. People’s spiritual lives can no longer be assumed to be totally independent of their material lives, and in addition to this point it has to say that we can find many social reforms that are founded on religions such as Gandhian movement, Islamic revolution of Iran and Tobacco concession (1891).

3. Darwin (1802-1882)'s theory and religion

Does evolution rule out God’s existence and is it against all religious scriptures? In 1859, Charles Darwin published On the Origin of
Species, his famous treatise on what we now call "evolution." It is one of the most important books of science ever written, and even today experts consider it to be a generally accurate account of the story of life.

Theologically speaking, however, it caused a fierce storm of controversy, and we are still wrestling with the question of what to make of it. Does Darwin's theory perhaps put the final nail in religion's coffin? Or can there perhaps be a fruitful encounter of religion with evolutionary thought?

For many scientists, evolution means that the universe is fundamentally impersonal and Godless. In fact, some of them (Steven Weinberg), asserts that evolution refutes the idea of an "interested" god much more decisively than physics does. Only a brief look at Darwin's theory will show why it disturbs the traditional religious belief in a loving and powerful Deity.

Darwin observed that all living species produce more offspring than ever reach maturity. Nevertheless, the number of individuals in any given species remains fairly constant. This means that there must be a very high rate of mortality, since more young are produced than ever reach maturity. To explain why some survive and others do not, Darwin better "adapted" to their environment than others. It appears that the most "fit" are the ones that survive to produce offspring. The vast majority of individuals and species lose out in the struggle for existence, but during the long voyage of evolution there emerge a staggering diversity of life, millions of new species, and eventually the human race.
What, then, is so theologially disturbing about the theory? What is it about evolution that places in question even the very existence of God? It can be summarized in three propositions:

1. The variations that lead to differentiation of species are purely random, thus suggesting that the workings of nature are "accidental" and irrational. Today the source of these variations has been identified as genetic mutations, and most biologists still follow Darwin in attributing these to "chance."

2. The fact that individuals have to struggle for survival, and that most of them suffer and lose out in this contest, points to the basic cruelty of the universe, particularly toward the weak.

3. The mindless process of natural selection by which only the better adapted organisms survive points to a universe that is essentially blind and indifferent to life and humanity.

These three inseparable ingredients—randomness, struggle, and blind natural selection all seem to suggest that the universe is impersonal, utterly unrelated to any "interested" God. Darwin himself, after reflecting on the "Cruelty", randomness, and impersonality in evolution, could never again return to the benign theism of his ancestral Anglicanism. Though he did not completely lose his religious faith, many of his scientific heirs have been much less hesitant to equate evolution with atheism. From the middle of the last century until today prominent thinkers have welcomed Darwinian ideas as the final victory of skepticism over religion. T.H. Huxley, Darwin's "bulldog" as he was known, thought evolution was antithetical to traditional theism. Ernst Haeckel, Karl Marx, Friedrich Nietzsche, and Sigmund Freud all found
Darwin's thought congenial to their atheism. And numerous others in our own time closely associate evolution with unbelief. Given this coalition of evolution and hostility to theism it is hardly surprising that the idea has encountered so much resistance from some religious groups. Darwin himself, however, did not envisage so unambiguous a union between evolution and skepticism. If he moved toward unbelief at all it was not without undergoing a great deal of personal anguish and mental reservation. In 1860, a year after the publication of *The Origins*, he wrote:

"There seems to me too much misery in the world. I cannot persuade myself that a beneficent and omnipotent God would have designedly created the Ichneumon date with the express intention of their feeding within the living bodies of caterpillars, or that cat should play with mice."

It seems that one question remains yet; we must ask here whether the Darwinian or the neo-Darwinian picture of nature in evolution is after all compatible with, fall into the four categories we are following throughout this chapter:

1. Conflict: it any wonder that we skeptics find in evolution the most compelling scientific reasons for rejecting? The three features of chance, struggle, and blind natural selection are so antithetical to any conceivable notion of divine providence or design, that we find it hard to understand how any scientifically educated person could still believe in God. In this position evolution is incompatible with any and all religious interpretations of the cosmos, not just with Christian fundamentalism. The commonness of chance variations, which today are called genetic "mutations," definitively refutes the idea of any ordering deity.
The fact of struggle and waste in evolution positively demonstrates that the cosmos is really not cared for by a loving God. Theology after Darwin will have to look these facts squarely in the face, and we don't think it can survive the encounter.

2. **Contrast:** according to this position science and religion are such disparate ways of looking at the world that they cannot meaningfully compete with each other. This means that evolution, which may be quite accurate as a scientific theory, bears not the slightest threat toward religion. "Conflict" arises not from the science of evolution itself, but from two different kinds of conflation. On the one hand, "scientific creationists" try to combine religious scriptures or biblical accounts of creation with modern "science," and on the other hand, scientific skeptics generally collapse evolutionary theory into an ideology of their own, "scientific materialism."

There is no will to examine scientific creationism and then follow that up with a critique of materialist evolutionism. It is emphasizing, though, that there is no way attaching scientific theories of evolution.

Scientific materialists generally write about evolution as though it were inherently anti-theistic. They are uncritically espousing the assumptions of a secularist intellectual culture. Their species of conflation may be called simply "evolutionism," an often subtle bonding of Darwinian ideas with hidden premises of secularism, naturalism, and the belief system it has been calling scientific materialism.⁴⁶

Evolution is a purely scientific theory that need not be cast in either materialist or religious terms. When stripped of any materialist overlay, evolutionary theory neither supports nor contradicts theism. The
important thing is that we conscious beings are here, and this is a significant enough fact irrespective of how we arrived. The particulars of the evolutionary past are useful for scientists to know about, but they are not important for defining who we really are or what our relation to God is. When our species came along, with its capacity for freedom, goodness, and love, it is clear that evolution had leapt onto a new plane altogether. No matter what our evolutionary past was like, the core of our human existence lies now beyond the realm of scientific illumination. So in response to materialist conviction that human consciousness "is but a tiny, late-arising twig" on the bush of life, we would submit that there are other plausible ways of looking at the same phenomenon, including a religious perspective that points to our inherent and eternal value. In the case of the apparent contradictions that evolutionary theory poses to theism we would reply very briefly as follows:

1) In the first place, the "chance" character of the variations which natural selection chooses for survival may easily be accounted for on the basis of our inevitable human narrowness and ignorance. Allegedly "random" genetic mutations may not really be random at all. They could very well be mere illusions resulting from the limitedness of our human perspective.

According to religious faith, a purely human angle of vision is always exceedingly restricted. Hence, what appears to be absurd chance from a scientific perspective could be quite rational and coherent from that of God's infinite wisdom?

2) Second, evolutionist complaints about the struggle, suffering, waste and cruelty of natural process add absolutely nothing new to
the basic problem of evil of which religion has always been quite fully appraised. Faith is always faith "in spite of "all the difficulties that defy reason and science. In fact, more than a few of our number consider evolution's severity to be quite consistent with the ancient religious theme that the earth is a "soul school "whose often stern lessons make us worthy of eternal life. If life posed no hardships, and if evolution were totally benign, how would we ever be aroused to develop our moral and spiritual character?

3) There is no more theological difficulty in the remorseless laws of inertia, gravity or any other impersonal aspects of science. Gravity, like natural selection, has no regard for our inherent personal dignity either. It pulls toward earth the weak and powerful alike—at times in a deadly way. But very few thinkers have ever insisted that gravity is a serious argument against God's existence. Perhaps natural selection should be viewed no less leniently.

At any rate, our contention is that humans cannot learn the nature of ultimate reality simply by pondering purely natural laws and occurrences.

Nature itself provides evidence neither for nor against god's existence. Something as momentous as the reality of God can hardly be decided by a superficial scientific deciphering of the natural world. Hence we are neither troubled nor heartened by evolutionary theory.

3. Contact: its sharp portrayal of the ideological biases in both creationism and evolutionism is very helpful. Contrast maybe an essential step in the process of thinking clearly and effectively about the relationship of evolution to religion.
For many scientists and religious thinkers contrast does not go nearly far enough. Evolution is more than just another innocuous scientific theory that theology can innocently ignore. When we think about religion in the post-Darwinian period we cannot have exactly the same thoughts that Augustine, Avicenna, Maimonides, Aquinas, or for that matter our grandparents and parents had, so we may need to recast all of theology in evolutionary terms.

Without fusing science with religion, theology is making fruitful contact with the same Darwinian ideas that evolutionists consider antithetical to God's existence. In fact for many of us, evolution is an absolutely essential ingredient in our thinking about God today. As the Roman Catholic theologian Hans Kung puts it, evolutionary theory now makes possible: 1) a deeper understanding of God—not above or outside the world but in the midst of evolution; 2) a deeper understanding of creation—not as contrary to but as making evolution possible; and 3) a deeper understanding of humans as organically related to the entire cosmos.47

A "contact" theology actually looks forward to facing the kinds of obstacles to native piety that evolution implies. A theology that seriously (and not just half-heartedly) mulls over Darwinian evolution cannot remain completely the same as before. Evolution demands that we think out more carefully how God might influence the world. For, even though the God of evolution is not a dictator, and apparently does not interrupt the flow of natural causation, religious faith implies necessarily that there is still some significant way in which God does influence and interact with the natural world. The religious sense of a God who arrives out of the future, and who comes
to meet the world in the mode of a repeatedly fresh promise of new life, is, we think, a most appropriate framework for interpreting the date of evolutionary science.

In summary, the idea of God, taken in consort with (and not as an alternative to) evolutionary theory, can help us account for the increasing complexity and consciousness that evolution has brought about not only in life, but in culture and religion as well, so it is suggested that the idea of a transcendent divine mystery explains not only the fact that the universe has order to it, but also that it has a penchant for novelty and creativity such as we see in evolution.

Divine creativity in terms of God's inviting (not forcing) the cosmos to express itself in increasingly more various ways. God as the ultimate source not only of the order in the world, but also of the troubling novelty and diversity that always somehow disrupt the status quo. As novelty comes into the world after all, the present order has to give way. And what we confusedly refer to as "chance," instead of being a "cause" of evolution, may be understood as the consequence of a breakdown in present forms of order as novelty enters in.

The ultimate or remote origin of this novelty is one of the things we mean by God. "God's will" in this account, is to maximize evolutionary novelty and diversity. God's role in evolution is not only that of being the stimulus that stirs the cosmos toward deeper novelty and beauty.

Our religious faith tells us that the same God who creates the universe also promises to save it from all its travail, suffering, and death. This would mean then that the whole story of cosmic evolution,
in all its detail and incredible breadth, is permanently taken into God's loving memory.

Our theology cannot tolerate a deity who merely creates and then abandons the world. For us the same God who invites the world to evolve is also intimately involved in the evolutionary process. God struggles along with all beings. Participating in both their pain and enjoyment, ultimately redeeming the world by an infinite compassion—so that in the end nothing is ever completely forgotten or lost.

This is only a brief sampling of how its encounter with evolutionary science is transforming contemporary theology. Many varieties of evolutionary theology exist today because of opposite theories and samples, and we have presented only a small piece of the rethinking going on in theology after Darwin. It is unfortunate though that much contemporary religious thought gets hung up in creationism or contrast. For although evolutionary theology is inevitably in need of constant revision—and we do not wish to enshrine for all time any particular version of it—we consider evolution to be, at least provisionally, a most appropriate and fruitful scientific framework within which to think about God today.

4. Confirmation: We fully endorse the attempts to construct an evolutionary theology. We would go even further in establishing the close connection between theism and evolution. Religious ideas provide much of the soil in which Darwinian ideas have taken root in the first place.

There are a number of recent studies that demonstrate theism's fundamental "confirmation" of evolutionary thinking such as some
Islamic thinkers, or rejected evolution theory, and we cannot discuss them all here.48

What some theologians (among others) have clarified, is that the infinite pours itself out in love to the finite universe for central idea of theistic.49

This is the fundamental meaning of "revelation." But if we think carefully about this central religious teaching, it should lead us to conclude that any universe related to the inexhaustible self-giving love of God must be an evolving one. In other words, it might endure what we know scientifically as a difficult and dramatic evolution toward increasing complexity, life, and consciousness. In the final analysis, it is a consequence of the infusion of god's self-giving love that the universe is exited onto path of self-transcendence, that is to say, evolution50.

Viewed in this light, the evolution of the cosmos is more than just compatible with theism, as the contrast position argues, or "consonant" with it, as the contact approach might say. Rather, it would not be too much to say that faith in a god of self-giving love actually anticipates an evolving universe.

It would be very difficult for some theologians to reconcile the religious teaching about God's infinite self-giving love with any other kind of cosmos. In summary; by the close of the century, the fact of evolution was accepted by virtually all scientists, and by vast majority of theologians. The causes of biological change were the subject of continuing discussion at both scientific and philosophical levels, and the broader interpretations of the evolutionary process varied widely. At one
extreme, there were still many average Christians, especially in rural areas, who rejected evolution completely; but most of the leaders of even the more conservative churches realized that there was overwhelming evidence in its favor. At the opposite extreme, naturalistic philosophies had relatively little popular support. The liberal middle position between traditionalism and modernism was gaining in strength.

Ian G. Barbour regarding influence of evolutionary thought on theology said that:

Methods in theology

(a) Revelation; among reactions to both evolution and biblical literalism by some conservatives, and rejection of all forms of revelation by some modernists, in the emerging liberal view, the Bible was valued as the fallible human record of man's religious experience—and also as witness to revelation, understood not as the dictation of a guaranteed text but as God's presence and activity in the life of Israel, the prophets, and Christ.

(b) Natural theology; The argument from design, in the form Paley had popularized, was permanently undermined by the theory of evolution. In a reformulated version, which was never as widely used, purposeful design was to be seen in the laws and structures through which life and mind had emerged, and in the directionality of the total process.

(c) Religious and moral experience; the distinctive new element that became dominant in the nineteenth-century theological method was the appeal to human experience as the basis for theology.

Today there is one large group of phenomena which can be explained only on the wave theory, and another large group which can be explained
only on the corpuscular theory. Scientists have to leave it at that, and wait for the future, in the hope of attaining some wider vision which reconciles both. We should apply these same principles to the questions in which there is a variance between science and religion.

According to Islamic philosophy it would in some ways to be compatible to theism and scriptures that will be explained in next chapter.

**Conclusion**

Under the headings of conflict, contrast, contact and confirmation, we can present the positions of each approach as it responds to the attractive questions that science is raising for religion today.

The conflict approach may at one moment have seemed the most compelling, but at other times we may have been attracted to the clarity of contrast, or to the cloudier experiments of contact, or even perhaps to the overtures of the confirmation approach. It is possible that any one individual may be able to embrace aspects of several approaches at the same time. Indeed, after gaining some distance from them, the four ways seem to resemble less a fixed typology than differentiated phases of a single complex process. "Confirmation" could conceivably be included under the more generic category of "contact". However, there is a clear logical distinction between the two approaches. In a way that include easily be lost if we allow it simply to be absorbed into our third type, "confirmation" brings out how religion in some way nourishes science.

Another reason for keeping the categories distinct is that followers of a "contact" approach may not always wish to accept some of the more radical implications of confirmation.
Summary of chapter Two

- Religions try to answer important but mysterious questions like "Where did the world come from?", and "What happens to us Hereafter?"

- Our understanding and interpretation of religion is collection of doctrines or any specific system of belief that springs from revelation that has been brought by prophets to illustrate descriptive and normative statements, and to guide human beings in religious resources.

- It is not possible to separate man's way of thinking from his way of living and his dealing in life. Religion bases its interpretation and viewpoint on believing that this universe, life and man have a Creator, a Lord, a God; and that man's existence on this earth is neither a meaningless nor aimless one, nor it is random happening. Life and man have their goals and values exceeding the time span of man's existence on the earth's surface.

- To illustrate the various possibilities, several different ways in which the sciences can be classified are first considered. Then the different ways in which the sciences have been classified - according to some interpretation - by certain key figures in the history of thought are sketched with emphasis upon the classification proposed by St. Thomas Aquinas.

- The methods of careful observation and experiment have been in use from antiquity, but became more widespread after the seventeenth century. Developments in instrument making, in
mathematics and statistics, in terminology, and in communication technology have altered the methods and the results of science.

- The goal of the sciences is to answer only those questions that are publicly testable. Science produces *useful models* which allow us to make often useful predictions.

- Scientific findings and religious beliefs are normally quite separate; the main battles between religion and science are in areas in which they overlap. Here, both often hold conflicting positions.

- The history of human thoughts further reveals that there has been constant conflict between the devotees of religion, philosophy and science. They are totally different worldviews and their outlook on life and of life is mostly antagonistic and conflicting.

- It seems there are four approaches and ways in which science and religion can be related to each other:

  1) Conflict: the conviction that science and religion are fundamentally irreconcilable.

  2) Contrast: the claim that there can be no genuine conflict since religion and science are each responding to radically different questions.

  3) Contact: an approach that looks for dialogue, interaction, and possible "consonance" between science and religion, and especially for ways in which science shapes religious and theological understanding.

  4) Confirmation: a somewhat quieter, but extremely important perspective that highlights the ways in which, at a very deep level, religion supports and nourishes the entire scientific enterprise.
There are three samples of clash:

- Marx (1818-1883) says that religion is meant to create illusory fantasies for the poor; he also wrote that religion was, “an opiate of the people.” That best describes his various views on religion. Marx wrote that there was a social relationship between the upper class or bourgeoisie and religion. The upper class that owned the means of production used religion as a tool to keep the working class or proletariat, oppressed and poor.

But; First, Marx doesn’t spend much time looking at religion in general; instead he focuses on the religion with which he is most familiar, second problem is his claim that religion is wholly determined by material and economic realities. This is not true. In Galileo (1564-1642) there is a bold commitment to the idea of unity (that there is one God behind both Scripture and nature). For Galileo, the same God who created the things that we discover through science also wrote all of the Scriptures. He did not ignore the Bible, but he knew very well that if his doctrine were proved, then it could not contradict the Scripture when they were rightly understood.

- Does Darwin (1809-1882)'s theory perhaps put the final nail in religion's coffin? Or can there perhaps be a fruitful encounter of religion with evolutionary thought? Darwin observed that all living species produce more offspring than ever reach maturity. Evolution is a purely scientific theory that need not be cast in either materialist or religious terms our religious faith tells us that the same God who creates the universe also promises to save it from
all its travail, suffering, and death. This would mean then that the whole story of cosmic evolution, in all its detail and incredible breadth, is permanently taken into God's loving memory. According to Islamic philosophy it would be some ways to be compatible with theism and scriptures that will be explained in next chapter.

- The model or combination of models that a person adopts for relating science and religion is likely to depend strongly on his or her up bringing, as well as on the fundamental presuppositions he or she brings to the issue. When talking about science and religion issues, we should emphasize those competent and successful scientists today can be found in all four categories. We should also avoid giving simplistic answers to questions about science and religion.

- In this research the discussion is not restricted to science and Christianity only, it discusses science and Islam and Hinduism too especially in Marx and Darwin theory.

- Under the headings of conflict, contrast, contact and confirmation, we can present the positions of each approach as it responds to the attractive questions that science is raising for religion today. But in our understanding, religions, especially Islam, are not only not opposed to scientific and technological progress, on the contrary, it encourages it and the same will be explained in next chapter more.
FOOTNOTES

3. www.websters-online-dictionary.org
4. Encyclopedia Britannica
5. Webster's New World Dictionary (Third College Edition)
6. Winston King, Encyclopedia of Religion, p 7693
7. Paul Edwards, The Encyclopedia of Philosophy, and V.7There are at least two different books titled "Encyclopedia of Philosophy," one by Paul Edwards, Paul Edwards and the other by Donal Borchedt, 8-ibid:p19
11. Ibid, Encyclopedia of Religion
19. The free Dictionary, By Farl
Conflation, a term that appears often in the pages ahead simply means the collapsing of distinct items in such a way that their differences are apparently lost.

Galileo Galilei (1564 – 1642) was an Italian scientist who formulated the basic law of falling bodies, which he verified by careful measurements. He constructed a telescope with which he studied lunar craters, and discovered four moons revolving around Jupiter and espoused the Copernican cause: www-history.mcs.st-andrews.ac.uk/Mathematicians/Galileo.html

At the same time as Engels, Marx took part in the political and philosophical struggle of his times, writing the Communist Manifesto a year before the Revolutions of 1848, although the two events had nothing to do with each other. Marx had broken with his university environment, German Idealism and the Young Hegelians, and took part in the debates of the European workers' movement, in particular in relation with the First International founded in 1864. He published the first tome of Das Kapital in 1867, a few years before the 1871 Paris Commune. The influence of his ideas, already popular during his life, was given added impetus by the victory of the Russian Bolsheviks in the 1917 October Revolution, and there are few parts of the world which were not significantly touched by Marxian ideas in the course of the twentieth century. The relation of Marx's own thought to the popular "Marxist" interpretations of it during this period is a point of controversy; he himself once said that "the only thing I know is that I'm not a Marxist" (In response to the views of a French Social-Democratic Party). While Marx's ideas have declined in popularity, particularly with the decline of Marxism in Russia, they are still very influential today, both in academic circles, some worker movements, and in political practice, and Marxism continues to be the official ideology of some Communist states and political movements.


Charles Robert Darwin (12 February 1809 – 19 April 1882) was an eminent English naturalist who achieved lasting fame by convincing the scientific community that species develop over time from a common origin. His theories explaining this phenomenon through natural and sexual selection are central to the modern understanding of evolution as the unifying theory of the life sciences, essential in biology and important in other disciplines such as anthropology, psychology and philosophy. Darwin developed his interest in natural history while studying first medicine, then theology, at university. His five-year voyage on the Beagle established him as a geologist whose observations and theorising supported Charles Lyell’s uniformitarian ideas, and the subsequent publication of his journal of the voyage made him famous as a popular author. Puzzled by the geographical distribution of wildlife and fossils he collected on the voyage; he investigated the transmutation of species and conceived his theory of natural selection in 1838. He had seen others attacked for such heretical ideas and confided only in his closest friends while carrying out extensive research to meet anticipated objections. However, in 1858, Alfred Russel Wallace sent him an essay describing a similar theory, forcing early joint publication of both of their theories. His 1859 book, On the Origin of Species, established evolution by common descent as the dominant scientific explanation of diversification in nature. Human origins and features without obvious utility such as beautiful bird plumage were examined in The Descent of Man, and Selection in Relation to Sex, followed by The Expression of the Emotions in Man and Animals. His research on plants was published in a series of books, and in his final book, he examined earthworms and their effect on soil. In recognition of Darwin’s pre-eminence, he was buried in Westminster Abbey, close to John Herschel and Isaac Newton.


44. Ibid: p. 49
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50. ibid: p 96